Ruiqi (Ricky) Chen

Master of Engineering | 1993/07 | Male
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Education

B.S. in Electronic Science and Technology, Southeast University Chengxian College, 2017.

M.S. in Integrated Circuit Engineering, Fuzhou University, 2020.

Work Experience

Research Assistant, Fudan University   **2022/02 – 2023/08**

Duties included: FPGA-based graph neural networks accelerator design and research article writing.

Supervisor: Professor Kun Wang

Visiting Researcher, VeriMake Innovation-Lab   **2020/06 – 2022/01**

Duties included: FPGA-based domain specific accelerator design and research article writing.

Supervisor: Mr. Yanxiang Zhu, Co-supervisor: Associate Professor Ming Ling

Research Projects

FPGA-based Graph Neural Networks Accelerator Design   **2022/02 - Present**

- An FPGA-based Overlay Processor is proposed for Graph Neural Networks (GNNs), facilitating rapid end-to-end software reconfiguration across diverse GNN model accelerators.
- Optimized designs for sparse matrix multipliers are presented, encompassing symmetric sparse matrix multipliers and high bandwidth general sparse matrix multipliers.
- Publications:
  [1]. "Graph-OPU: A Highly Integrated FPGA-Based Overlay Processor for Graph Neural Networks", in **FPL**, 2023.
  [2]. "Graph-OPU: An FPGA-Based Overlay Processor for Graph Neural Networks", in **FPGA**, 2023.
  [3]. "eSSpMV: An Embedded-FPGA-based Hardware Accelerator for Symmetric Sparse Matrix-Vector Multiplication," in **ISCAS**, 2023.

Hardware Accelerator for Computer-Aided Drug Design   **2020/07 - Present**

- A hardware-accelerated approach for AutoDock Vina has been developed, leading to deployments on GPU and FPGA platforms with average speedups of 19.8x and 3.7x, respectively.
- An FPGA-based heterogeneous accelerator has been introduced for predicting GPCR ligand biological activity values. The system operates 54.5x faster than a CPU counterpart and achieves an energy efficiency that is 35.2x superior to GPU implementations.
- Publications:
  [1]. "FPGA Accelerating Multi-source Transfer Learning with GAT for Bioactivities of Ligands Targeting Orphan G Protein-coupled Receptors", in **FPL**, 2023.
  [2]. "Vina-FPGA: A Hardware-Accelerated Molecular Docking Tool With Fixed-Point Quantization and Low-Level Parallelism," **IEEE Trans. VLSI. Syst**, 2023.
  [3]. "Biological Activity Prediction of GPCR-targeting Ligands on Heterogeneous FPGA-based Accelerators," in **FCCM**, 2022.
  [4]. "Accelerating AutoDock Vina with GPUs," **Molecules**, 2022

Skills

- Programming: Verilog, VHDL, HLS, Python, C/C++
- Software: Xilinx Vivado, Xilinx Vitis, Intel Quartus, Modelsim

For more information, please visit my **website**.